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The emergence of /Viŋ/ rhymes in Northern Min Chinese

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Introduction

Languages differ not only in the sounds they use, but also in the different combinations of sounds they allow. Some combinations commonly found in one language may not be seen in another. For example, rhymes composed of diphthong with nasal coda, such as /ain/ are common in English (e.g. "line" /lain/), but are absent in most Chinese dialects. Nevertheless, Eastern Min and Northern Min stand out among Chinese dialects in possessing /Viŋ/ rhymes such as /aiŋ/. However, the phonological analysis of these 'unusual' rhymes remain controversial, and its origin remain largely unexplored.

Diachronic approach

This paper provides a diachronic explanation (see Ohala 1989, Blevins 2004, Bermúdez-Otero 2007, Hansson 2008 among others) to the emergence of /Viŋ/ rhymes in Northern Min. First, by applying comparative methods, I reconstruct the earlier forms of /Viŋ/ rhymes in Early-Northern-Min and Proto-Northern-Min and figure out related sound changes. Then, I explore the mechanism of these sound changes and the details of evolutionary path. Last, I discuss about the possible phonological analyses of /Viŋ/ rhyme.

/Viŋ/ rhymes in Jian Ou

Table 1. Jian Ou rhymes (my own fieldwork notes, /Viŋ/ rhymes highlighted)

i	y	e	ɛ iɛ uɛ	a ia ua	ɔ iɔ	o	u	ai uai	au iau	iu	ui			
iŋ				aŋ iaŋ uaŋ		oŋ ioŋ		aiŋ			uiŋ	eiŋ	øyŋ	

Comparative study and sound changes

- Below are some corresponding sets between Early Northern Min, Huang Keng, Proto Northern Min, and Jian'ou, illustrating the emergence of /Viŋ/ rhymes in Northern Min.

Table 2. Corresponding sets illustrating the emergence of /Viŋ/ rhymes in Northern Min

Example	*ENM	HK		*PNM		SB	ZQ	JO
天 sky	*ien	iɛn	>	*ieŋ	>	iŋ	iŋ	iŋ
心 heart	*i:n	en	>	*iŋ	>	eiŋ	eiŋ	eiŋ
军 troop	*uin	uin	>	*yŋ	>	ueiŋ	euŋ	øyŋ
等 wait	*ən	ən	>	*əŋ	>	aiŋ	euŋ	aiŋ
星 star	*ɛn	ən	>	*aiŋ	>	aiŋ	aiŋ	aiŋ
千 thousand	*an	an	>	*aiŋ	>	aiŋ	aiŋ	aiŋ
山 moutain	*ɔn	an	>	*uaiŋ	>	uaiŋ	uaiŋ	uiŋ
酸 sour	*on	on	>	*oiŋ	>	ueiŋ	euŋ	oŋ
三 three	*aŋ	aŋ	>	*aŋ	>	aŋ	aŋ	aŋ
肠 intestine	*oŋ	oŋ	>	*oŋ	>	ɔŋ	auŋ	oŋ
动 move	*uŋ	uŋ	>	*uŋ	>	əŋ	oŋ	oŋ

Notes:

*ENM=Early Northern Min, the ancestor of all Northern Min varieties, reconstructed by 沈瑞清 (2018)

HK=Huang Keng, my own fieldwork notes, see 沈瑞清 (2018) for details

*PNM=Proto Northern Min, the ancestor of all Northern Min varieties except Huang Keng, reconstructed by 孙顺 (2016), modified according to 秋谷裕幸 (m.s.)

SB=Shi Bei, adopted from 秋谷裕幸 (2008)

ZQ =Zhen Qian, adopted from 秋谷裕幸 (2008)

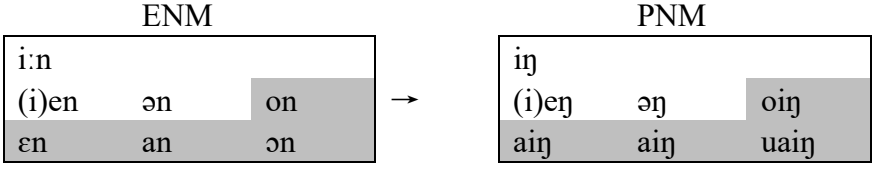
JO=Jian Ou, my own fieldwork notes

As shown in Table 2, there are at least three different stages related to the emergence of /Viŋ/ rhymes. At the first stage, illustrated by Early Northern Min and Huang Keng, there is no /Viŋ/ rhymes, but two nasal codas *-n and *-ŋ. In the second stage, illustrated by Proto Northern Min, coda *-n and *-ŋ have merged into a single *-ŋ, and some of the *-n rhymes in the previous stage become /Viŋ/ rhymes. At the third stage, illustrated by Shi Bei and Jian Ou, some previous /Vŋ/ rhymes become /Viŋ/ rhymes. Therefore, there are two sound changes that give rise to the emergence of /Viŋ/ rhymes. I examine them one by one below.

■ The first sound change from ENM to PNM

The most significant change from the first stage to the second stage is the change from *-n in Early-Northern-Min (ENM) to *-ŋ in Proto-Northern-Min (PNM), as illustrated below:

Figure 1. Change from *-n (ENM) to *-ŋ (PNM)



As can be learned from the figure, some of the /Vn/ rhymes become /Vŋ/ rhymes, while others become /Viŋ/ rhymes. The condition of becoming /Viŋ/ is either low vowels or back (rounded) vowels.

- The second sound change from PNM to JO
  Some /Vŋ/ rhymes in Proto-Northern-Min (PNM) become /Viŋ/ rhymes in Jian Ou (JO), e.g. *iŋ>eiŋ, *yŋ>øyŋ.
- The phonetic details and conditions for these two sound changes are explained below.

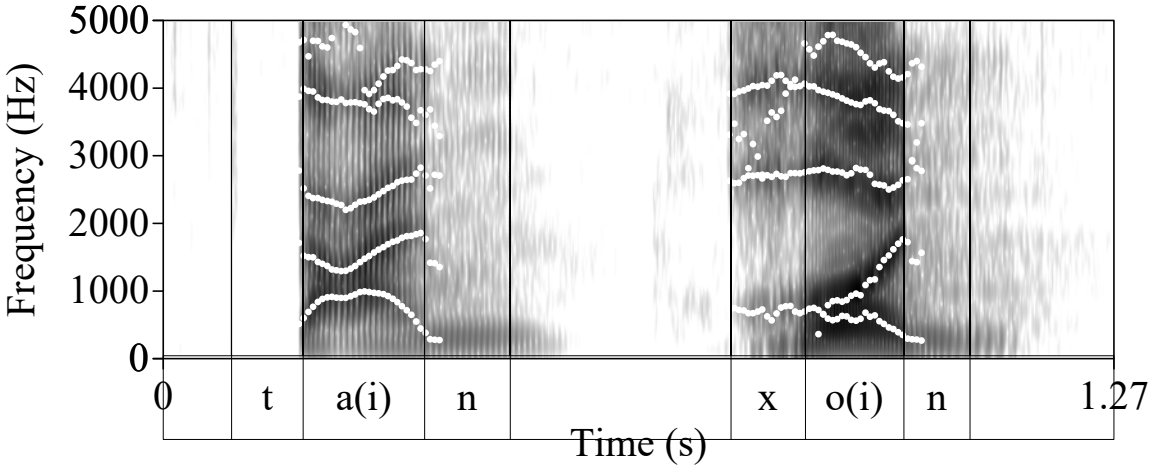
- Where does /Viŋ/ come from?
  - To understand the origin of /Viŋ/ rhymes, we need to explore the nature of /Vn/ at the first stage, represented by reconstructed Early-Northern-Min and a single conservative Northern Min variety, i.e. Huang Keng.
  - /Vn/ rhymes in Huang Keng (my own fieldwork notes, see 沈瑞清 2018)

Table 3. Huang Keng rhymes

ɿ	i	y	ɛ	a	o	u	ŋ	ei	øy	ai	oi	iu	eu	ɛu	au
			iɛ	ia	io					iai	ioi			iəu	
				ua	uo					uai					
	in			an[aⁱn]	on[oⁱn]		ən	en							
			iɛn	ian[iaⁱn]											
	uin			uan[uaⁱn]			uən								
	yin				yon[yoⁱn]										
				aŋ	oŋ	uŋ									
				iaŋ	ioŋ	iuŋ									
					uoŋ										

- Phonetics of /Vn/[Vⁱn] rhymes in Huang Keng
  Interestingly, some of the /Vn/ rhymes highlighted in Table 3 show a very long transition from [V] to coda [n], as shown below.

Figure 3. Spectrums of /tan.5/[taⁱn] 'pole' and /xon.3/ [xoⁱn] 'swallow (v.)' in Huang Keng



As can be learnt from the figure, the transitional period between vowel [V] and coda [n] is so long that these rhymes could be described as [Vⁱn]. Interestingly, not all /Vn/ rhymes in Huang Keng exhibit this long transitional period. The condition is low or

back vowels, such as [a] and [o], which is exactly the same as the condition for changing into /Viŋ/, as illustrated in Figure 2. Based on these evidences, I am proposing a coarticulatory path to sound become explain the emergence of /Viŋ/ rhymes.

- A coarticulatory path to sound change
  Earlier studies show that there is a close connection between coarticulation and sound change (Ohala, 1989; Blevins, 2004; Hansson, 2008; Beddor, 2009; Kleber, Harrington, & Reubold, 2012). I argue that the emergence of /Viŋ/ rhymes could also be explained by the phonologization (Kiparsky 2015) of coarticulatory effects. For [Vn] rhymes, a transitional period between [V] to [n] is an inevitable coarticulatory effect. This is especially salient for low or back vowels as they have a longer transition route than non-low, non-back vowels. When the transitional period becomes longer, an [i]-like formant transition emerges and may become perceptually salient to the listeners. Thus, the listeners may no longer identify [i]-like formant transition in [V^{i}n] as coarticulatory effect between [V] and [n], but reanalysis it as a part of the rhymes. As a result, [V^{i}n] is now identified as /Vin/ phonologically. This change gives rise to the emergence of /Viŋ/ rhymes at the second stage.
- At the second stage, all rhymes with coda /n/ become /ŋ/ as a shared innovation of Proto-Northern-Min, the ancestor of all Northern Min varieties except Huang Keng. Therefore, /Vn/ rhymes with low or back vowels become /Vin/ and then to /Viŋ/ rhymes, while /Vn/ rhymes with non-low, non-back vowels, which are not involved in the /Vn>/Vin/ change, become /Vŋ/ rhymes instead.
- From the second stage to the third stage, a further change leads to the blooming of /Viŋ/ rhymes, i.e. the diphthongization of high vowels, e.g. *iŋ>eiŋ, *yŋ>øyŋ. The diphthongization of high vowels is widely attested in world's languages. The change of *əŋ>aiŋ (JO) may seem a bit strange at first sight. But the reconstruction of *əŋ can be modified to *ɯŋ, and the change is thus *ɯŋ(>*ɤɯŋ)>aiŋ. The revised *ɯŋ also help to explain the ZQ form by *ɯŋ(>*ɤɯŋ)>euŋ. In ZQ, there is further diphthongization change *oŋ>auŋ.
- To summarize, a three-stage evolutionary path from /Vn/ rhymes to /Viŋ/ rhyme, at both phonetic and phonological level, is illustrated in the table below.

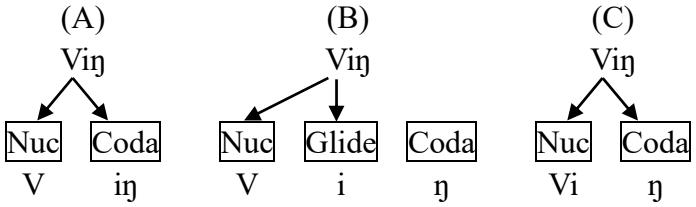
Table 4. The emergence of /Viŋ/ rhymes at phonetic and phonological level

	Stage I Early Northern Min	Stage II Proto Northern Min	Stage III Jian Ou
Phonetic	[an~a^{i}n~ain]	[aiŋ]	[aiŋ]
Phonologcial	/an/>/ain/	/aiŋ/	/aiŋ/
Phonetic	[in]	[iŋ~e^{i}ŋ]	[eiŋ]
Phonological	/in/	/iŋ/	/eiŋ/

On the phonological analysis of /Viŋ/ rhymes

In previous literature, there are at least three different analyses of /Viŋ/ rhymes.

Figure 4. Three analyses of /Viŋ/ rhymes



Analysis (A) is proposed by (北大教研室, 2003) for Fuzhou and Jian Ou, in which both /i/ and /ŋ/ is treated as codas. Analysis (B) is proposed by Norman (1969) for Jianyang and by Jiang-King (1996) for Fuzhou, in which /i/ is treated as a post-vocalic glide. Analysis (C) is proposed by Chan (1997) for Fuzhou, in which /Vi/ is treated as a diphthong nucleus. The diachronical path illustrated in this paper demonstrates that in Northern Min /i/ in /Viŋ/ rhymes evolve from coarticulation between /V/ and /n/ in /Vn/ rhymes, and has been phonologized as /Vin/ before changing to /Viŋ/. Therefore I argue that analysis (C) in which /Vi/ is treated as a diphthong nucleus, is the most viable one, at least for Northern Min varieties.

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